

Patent Claims

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*add all* A method of monitoring and/or determining motor oil quality by determining the viscosity of the motor oil during the operation of an internal combustion engine, in particular a motor vehicle engine, characterized in that changes in the oil viscosity are determined and evaluated as a function of the temperature and the frictional torque of the engine.

2. The method according to Claim 1, characterized in that the frictional torque of the engine is determined from the starter torque that has been determined.
3. The method according to Claim 1 or 2, characterized in that the starter torque is determined from the electric power consumed by the starter during start, the starter characteristic curve being known.
4. The method according to Claim 2, characterized in that the frictional torque of the engine is derived from the engine acceleration power consumed.
5. The method according to Claim 1, characterized in that the reversible temperature effect is taken into account.
6. The method according to Claim 1, characterized in that a change in viscosity is only taken into account if the value (actual value) is outside a range of -15% to +50% of a predefined viscosity value at the same temperature.
7. A method of determining the viscosity of the motor oil of an internal combustion engine, characterized in that the viscosity of the motor oil is determined from the engine frictional torque.

8. The method according to Claim 7,  
characterized in that the viscosity of the motor oil is derived from an estimate of  
the engine frictional torque.

9. The method according to one of Claims 7 to 8, characterized in that the engine  
frictional torque is determined from the engine data available in the engine  
controller.

10. The method according to Claim 9,  
characterized in that the following engine data are used for determining the  
engine frictional torque:

- injection time and/or throttle valve position to determine the engine torque  
generated;
- a signal that indicates whether a torque is transmitted to the drive train;
- and signals concerning the operating condition of any other auxiliary units  
directly driven by the engine.

11. The method according to Claim 9,  
characterized in that in a diesel engine the following engine data are used for  
determining the engine frictional torque:

- a signal that indicates whether a torque is transmitted to the drive train;
- the load signal of the generator as a measure of the electric power generated  
by the generator;
- the engine rpm;
- the injected amount of fuel;
- the engine temperature, and
- the ambient temperature.

12. The method according to one of Claims 7 through 11, characterized in that the  
frictional torque of the engine is derived from the determination of the start torque  
and the engine acceleration power consumed.

13. The method according to Claim 12,  
characterized in that the starter torque can be determined from the electric power  
consumed by the starter, the starter characteristic being known.

14. The method of determining the viscosity of motor oil of an internal combustion  
engine according to Claim 12, characterized in that during start the time between  
start until the starter disengagement speed is reached is measured, so that with  
the constant fuel amount injected during this time being known, the frictional  
torque of the engine can be estimated from the measured time.

15. A device for carrying out the method according to one of Claims 1 through 14,  
characterized in that the device has a controller for processing and transforming  
measured data and at least one memory unit, the characteristic curves needed  
for determining the viscosity being stored in the memory unit or in each memory  
unit.

16. The device according to Claim 15,  
characterized in that the characteristic curves are stored in the form of lookup  
tables.

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